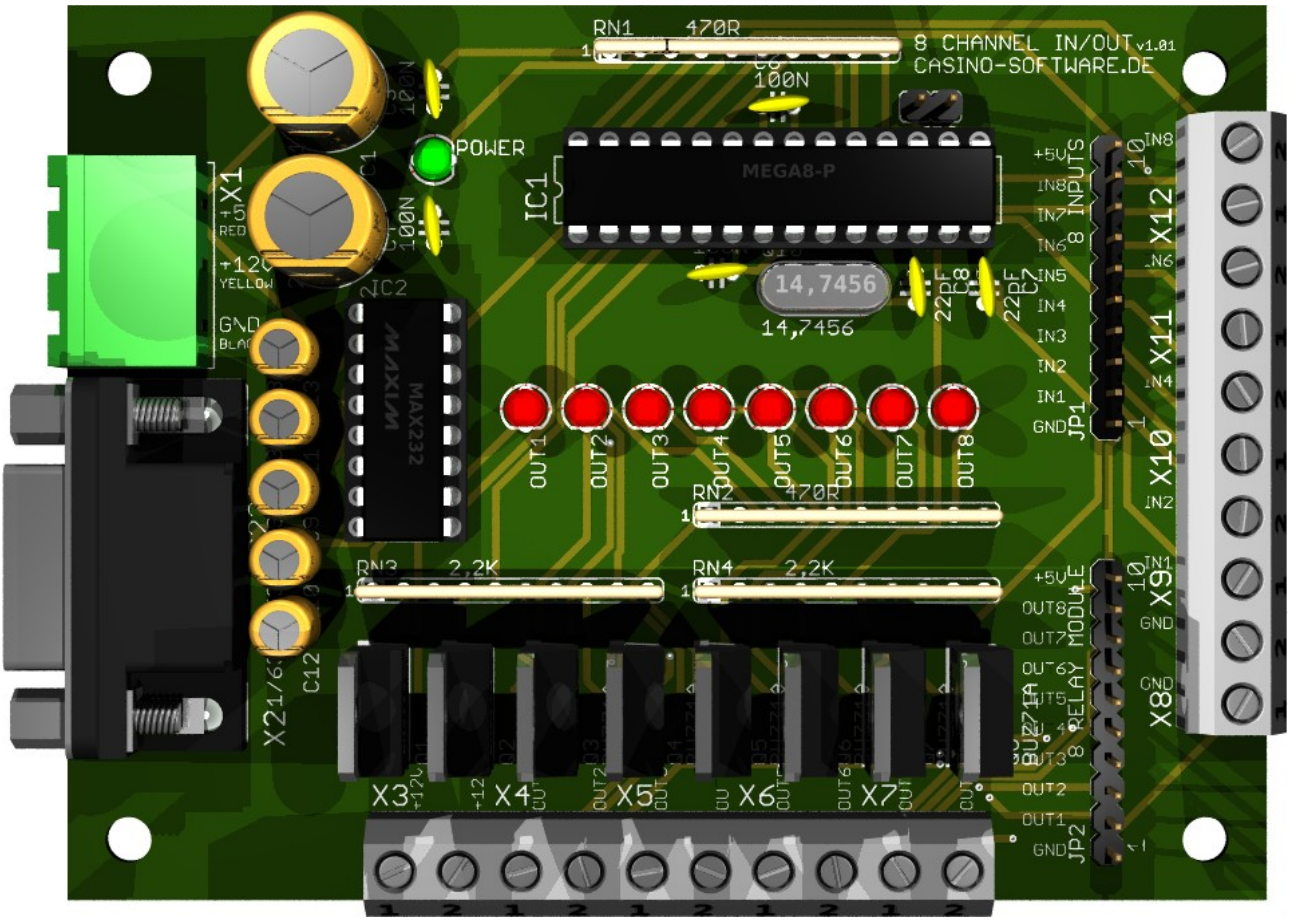
8 Channel Digital IN/OUT Module

User Manual
Date: 25. May 2015



Content

1. Introduction....3
2. Features....3
3. Specification....4
4. Applications examples....4
5. Connections....5
Power connector....5
Com (USB) port....5
Inputs....6
8 inputs connector pin out....6
Outputs....7
8 outputs connector pin out....7
6. Commands....8
Serial port parameters....8
INPUT functions:....9
OUTPUT functions:....10
7. Ready to use software....12
8. Safety instructions....13

1. Introduction

The 8 channel digital IN/OUT module offers 8 digital input channels and 8 digital output channels. Connection to the board is done by serial com port. The module can be used to control electrical devices, e.g. heaters, vans, pumps, valves, solid-state relays and other power equipment for home automation as well as industrial automation.

The module's 8 digital inputs can be used to determine the state of push buttons, switches, relay contacts, limit or safety switches or other digital signals. The number of inputs/outputs can be further expanded by connecting more cards to the PC.

The 8 channel digital IN/OUT module is controlled by simple commands. A complete overview of commands can be found in the COMMANDS section below. You can write custom applications with every programming language supporting COM port functionality.

The diagnostic application (IO8.EXE) can also be used as command line application. This way it is possible to control the module by using batch file. Example batch files are included with the diagnostic software.

2. Features

- 8 Digital inputs (e.g push button, switch, relay contact, ...)
- 8 Digital N-channel power MOSFET outputs (55V/30A).
- Input and output connection via simple screw terminals.
- Additionally on board plug to connect an 8 channel relays board.
- Every output has a LED indicator.
- Works on the USB (with USB to Serial converter) or serial port.
- Diagnostic software and example source code available on our website https://www.casino-software.de/8inout/

3. Specification

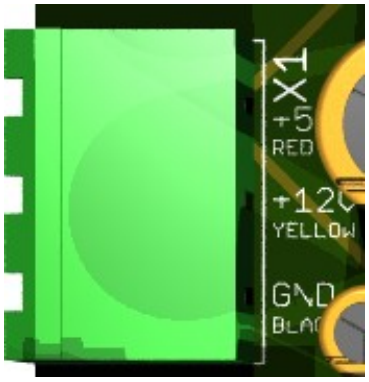
- 8 digital N-channel power MOSFET outputs
  IRLZ34N (55V/30A)
- 8 digital inputs channels, active LOW
- 9-pole serial connector - type EU-9F
- Power supply requirements: +5V DC / 500mA
- Communication: serial
- Led-s: Power ON Led, Output Led each channel
- Operating temperature range: from -30 ºC to +80 ºC
- PCB parameters: FR4 / 1.5mm / two layers / metalized holes / HAL / white stamp / solder mask
- Dimensions: W=75mm x L=100mm x H=24mm

4. Applications examples

- Home automation
- Industrial automation
- Control electrical devices like lighting systems, heaters, cooling vans, pumps, valves, solenoids, and more.
- Alarm system
- Model railway control
- Illuminated push button panel, e.g. slot machine
- ...

5. Connections

Power connector



The operating voltage is connected to clamp X1. The 8 IN/OUT board needs a supply voltage of +5V.
The second voltage (+12V) is just routed to the output screw terminals and finally used for supplying the output circuit.

Instead of connecting the +12V you can connect up to +24V.
The ground connection (GND) of both voltage must be connected.

The interfacing of +5V, +12V and GND is printed on the board.
You can use the PC power supply or a separate power supply.
Depends on the load be sure the power supply is strong enough!

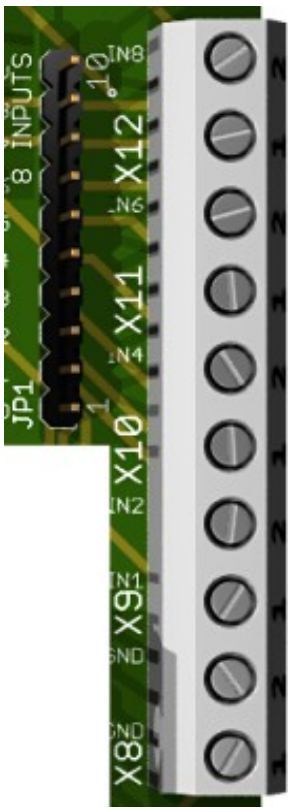
Com (USB) port

Connection to the computer or other micro controller circuit board is done via 9-pole RS232 connector X2. Be sure the RS232 cable is not longer than 3m.

In order to operate the 8 channel digital IN/OUT module via USB, you can use a RS232 to USB converter.

COM port settings: Baud 19200, Data bits 8, Parity none,
Stop bits 1, Handshaking none

Inputs



Input is generally HIGH (1),
connection to ground makes the input LOW (0).

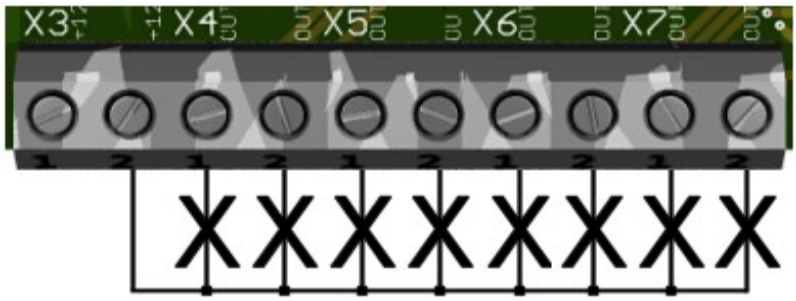
The inputs can be connected to the screw terminals X8 – X12, or to the pin header JP1.

8 inputs connector pin out

JP1.1 - GND	X8.1, X8.2	
JP1.2 - IN1	X9.1	(active low, open=1, ground=0)
JP1.3 - IN2	X9.2	(active low, open=1, ground=0)
JP1.4 - IN3	X10.1	(active low, open=1, ground=0)
JP1.5 - IN4	X10.2	(active low, open=1, ground=0)
JP1.6 - IN5	X11.1	(active low, open=1, ground=0)
JP1.7 - IN6	X11.2	(active low, open=1, ground=0)
JP1.8 - IN7	X12.1	(active low, open=1, ground=0)
JP1.9 - IN8	X12.2	(active low, open=1, ground=0)
JP1.10 - +5V		

Outputs

The outputs can be connected to the screw terminals X3 – X7, or to the pin header JP2.



8 outputs connector pin out

JP2.1 - +12V	X3.1, X3.2	
JP2.2 - OUT1	X4.1	(active low, 0=open, 1=ground)
JP2.3 - OUT2	X4.2	(active low, 0=open, 1=ground)
JP2.4 - OUT3	X5.1	(active low, 0=open, 1=ground)
JP2.5 - OUT4	X5.2	(active low, 0=open, 1=ground)
JP2.6 - OUT5	X6.1	(active low, 0=open, 1=ground)
JP2.7 - OUT6	X6.2	(active low, 0=open, 1=ground)
JP2.8 - OUT7	X7.1	(active low, 0=open, 1=ground)
JP2.9 - OUT8	X7.2	(active low, 0=open, 1=ground)
JP2.10 - +5V		

It is possible to connect an external relays board to jumper JP2 and control high voltage devices.

You can find a suitable relay board in our web shop at https://www.casino-software.de/shop/

6. Commands

Serial port parameters

Baud rate	19200 bps
Data bits	8
Stop bits	1
Parity	no
Handshaking	no

Commands to the 8 IN/OUT board must end with a "carriage return". In computing, the carriage return (CR) hexadecimal 0D or decimal 13, is one of the control characters in ASCII code. The 8 channel digital IN/OUT module detects a byte with the value #13 ($0D) as command end.

Example: READ_IN_ALL$0D

All data from the 8 channel digital IN/OUT module ends with a "carriage return" and "line feed" (CRLF = Enter). This way you can detect the end of the data. When you receive the bytes $0D$0A all data has been received and the data can be processed.

The communication from and to the 8 IN/OUT board can be tested with a terminal program.

For each executed command, the 8 IN/OUT board controller sends an answer frame.

Note that there must be minimum 5ms interval between every two commands !

INPUT functions:

- READ_IN <number>

read status of an input
Value between 1 and 8 which corresponds to the input channel whose status is to be read
Example: "READ_IN 8" read status of input 8
Returns: "READ_IN<number>=n" status of the input <number> (0 = input is GND, 1 = input is OPEN)

- READ_IN_ALL

read status of all inputs
Example: "READ_IN_ALL"
Returns: "READ_IN_ALL =n"
bit 0 = input 1 (0 = input is GND, 1 = input is OPEN)
bit 1 = input 2 (0 = input is GND, 1 = input is OPEN)
bit 2 = input 3 (0 = input is GND, 1 = input is OPEN)
bit 3 = input 4 (0 = input is GND, 1 = input is OPEN)
bit 4 = input 5 (0 = input is GND, 1 = input is OPEN)
bit 5 = input 6 (0 = input is GND, 1 = input is OPEN)
bit 6 = input 7 (0 = input is GND, 1 = input is OPEN)
bit 7 = input 8 (0 = input is GND, 1 = input is OPEN)

- ON_IN_MESSAGE 0|1

automatically send a message if state of input changes, default = 1
"ON_IN_MESSAGE 0" send no message if state of input changes
"ON_IN_MESSAGE 1" send a message if state of input changes
Example: "ON_IN_MESSAGE 0" or "ON_IN_MESSAGE 1"
Returns: "ON_IN_MESSAGE=n". On Error "ERROR".

If an input state changes, the board sends a message
“IN<number>=n”
This way there is no need to poll the input(s) state!

OUTPUT functions:

- WRITE_OUT <data>

Set outputs according to data.
Value between 0 and 255 that is sent to the output port
(8 channels)
Example: "WRITE_OUT 255"
Returns: "WRITE_OUT=<data>"
bit 0 = output 1 (0 = set output to OPEN, 1 = set output to GND)
bit 1 = output 2 (0 = set output to OPEN, 1 = set output to GND)
bit 2 = output 3 (0 = set output to OPEN, 1 = set output to GND)
bit 3 = output 4 (0 = set output to OPEN, 1 = set output to GND)
bit 4 = output 5 (0 = set output to OPEN, 1 = set output to GND)
bit 5 = output 6 (0 = set output to OPEN, 1 = set output to GND)
bit 6 = output 7 (0 = set output to OPEN, 1 = set output to GND)
bit 7 = output 8 (0 = set output to OPEN, 1 = set output to GND)

- SET_OUT <number>

Set a single output
Value between 1 and 8 which corresponds to the output channel
that is to be set
Example: "SET_OUT 8" (set output 8 to GND)
Returns: "SET_OUT=<number>"

- SET_OUT_ALL

Set all outputs, same than command "WriteOut 255"
Example: "SET_OUT_ALL" (set output 1-8 to GND)
Returns: "SET_OUT_ALL=1"

- CLEAR_OUT <number>
Clear a single output
Value between 1 and 8 which corresponds to the output channel that is to be cleared
Example: "CLEAR_OUT 8" (clear output 8)
Returns: "CLEAR_OUT=<number>"

- CLEAR_OUT_ALL
Clear all outputs, same than command "WriteOut 0"
Example: "CLEAR_OUT_ALL" (clears output 1-8)
Returns: "CLEAR_OUT_ALL=1"

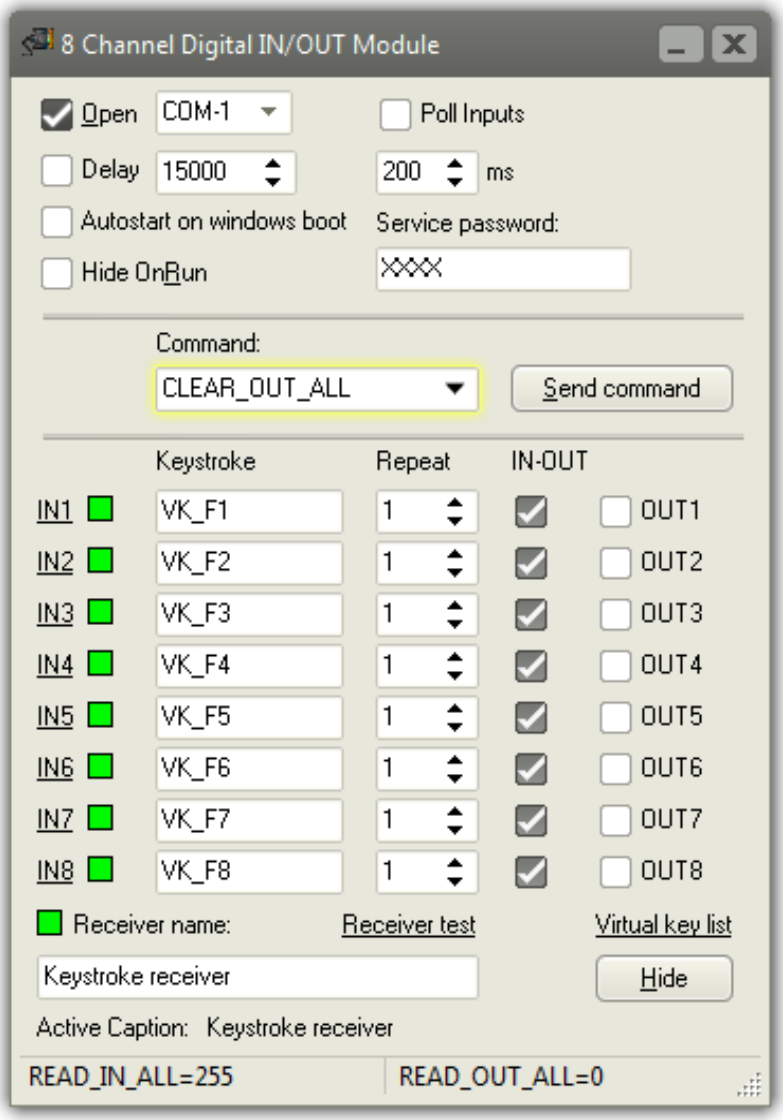
- READ_OUT <number>
read status of an output
Value between 1 and 8 which corresponds to the output channel whose status is to be read
Example: "READ_OUT 8" read status of output 8
Returns: "READ_OUT<number>=n" status of the output <number> (0 = output is OPEN, 1= output is GND)

- READ_OUT_ALL
Receive the status of all outputs
Example: "READ_OUT_ALL"
Returns: "READ_OUT_ALL=n"
bit 0 = output 1 (0 = output is OPEN, 1 = output is GND)
bit 1 = output 2 (0 = output is OPEN, 1 = output is GND)
bit 2 = output 3 (0 = output is OPEN, 1 = output is GND)
bit 3 = output 4 (0 = output is OPEN, 1 = output is GND)
bit 4 = output 5 (0 = output is OPEN, 1 = output is GND)
bit 5 = output 6 (0 = output is OPEN, 1 = output is GND)
bit 6 = output 7 (0 = output is OPEN, 1 = output is GND)
bit 7 = output 8 (0 = output is OPEN, 1 = output is GND)

A wrong command returns:
"UNKNOWN_COMMAND=<command>"

7. Ready to use software

You can download a “keystroke edition” of the example software on our website. With the “keystroke edition” it is possible to send keystrokes to an other windows application. This way the other application can be controlled by the inputs of the 8 Channel Digital IN/OUT module!



Just enter the window title of the keystroke receiver and set up the keystrokes you want to send. It is even possible to send mouse events like left, right or middle mouse button click.

The “keystroke edition” can run invisible on Windows boot, working in the background.

Use sndmsg.exe to send commands to the running io8.exe

Another ready to use software can be found here:
http://www.bksoft.de/index_licht24pro_e.htm

8. Safety instructions

The 8 channel digital IN/OUT module is intended for installation in a housing.

Only use the 8 channel digital IN/OUT module in low-voltage circuits (max. 24V). Higher voltage rates are not permissible. There is danger to life through an electric shock and a risk of fire!

Ensure that all the electrical connections and connection cables conform to the regulations.

The entire product may not be modified or reassembled. Operation is only permissible in dry indoor locations. Never operate the device immediately after bringing it from a cold to a warm room. The resulting condensation water may damage the device. Do not expose the 8 channel digital IN/OUT module to high temperatures, strong vibrations, high degrees of humidity or chemically aggressive dusts, gases and vapors.

Electronic components of the 8 channel digital IN/OUT module may heat up during operation. Ensure sufficient air circulation around the device to prevent heat build-up and overheating.

On industrial sites the accident prevention regulations of the association of the industrial workers' society for electrical equipment and utilities must be followed.

In case of damage incurred by disregarding these operating instructions, the warranty claim is void. Liability for any and all consequential damage is excluded! We do not assume any liability for damage to property or personal injury caused by improper use or the failure to observe the safety instructions!

The 8 channel digital IN/OUT module was EMV tested according to industrial and domestic standards and complies with both these standards. Proof of CE conformity has been established and the corresponding declarations are obtainable from the manufacturer.

This device complies with part 15 of the FCC rules provided the enclosed instructions are followed to the letter. Use of the device is subject to the following conditions: (1) this device must not cause harmful interference and (2) the operation of this device should not be influenced by unwanted interference. More information about FCC can be found at http://www.fcc.gov